CERTIFICATE OF VERIFICATION

I, Yong Yeon KIM of 648-23 Yeoksam-dong, Gangnam-gu, Seoul, Republic of Korea state that the attached document is a true and complete translation to the best of my knowledge of the Korean-English language and that the writings contained in the following pages are correct English translation of the specification and claims of the Korean Patent Application No. 10-2002-0053562 dated this 5th day of September, 2002.

·Date: Aug. 31, 2006

·Signature of translator:

Yong Yeon KIM

[Translation]

KOREAN INTELLECTUAL PROPERTY OFFICE

This is to certify that the following application annexed hereto is a true copy from the records of the Korean Industrial Property Office.

Application Number: 10-2002-0053562

Date of Application: September 05, 2002

Applicant(s): LG Electronics Inc.

COMMISIONER

[ABSTRACT OF THE DISCLOSURE]

[ABSTRACT]

The present invention relates to an organic EL device using an anode supplementary electrode as well as a cathode supplementary electrode of an organic EL device flat display panel. In an organic EL forming an organic EL layer, an organic EL device according to the present invention includes a cathode supplementary electrode formed on an electric insulating film.

[TYPICAL DRAWING]

FIG. 3ga

[INDEX WORDS]

organic EL

[SPECIFICATION]

[TITLE OF THE INVENTION]

ORGANIC ELECTROLUMINESCENCE DEVICE AND FABRICATING METHOD FOR THE SAME

[BRIEF DESCRIPTION OF THE DRAWINGS]

FIG.1 illustrates a plan view of a related art full color organic EL display device.

FIG. 2 illustrates a plan view of a related art shadow mask.

FIGS. 3aa to 3ga illustrate perspective views each showing an organic EL device according to the present invention.

FIGS. 3ab to 3gb illustrate plan views each showing an organic EL device according to the present invention.

FIG. 4 illustrates a section view of 'A' in FIG. 3gb according to the present invention.

FIG. 5 illustrates a section view of 'B' in FIG. 3gb according to the present invention.

FIG. 6 illustrates a plan view of a shadow mask according to the present invention.

****Reference numerals of the essential parts in the drawings****

10: substrate 11: anode

11-1: anode supplementary electrode

11-2: anode strip wiring

12: insulating film 13: cathode

13-1: cathode supplementary electrode

13-2: part for contacting with the cathode supplementary electrode

14: electric insulating strip

15-1: shadow mask projected part

[DETAILED DESCRIPTION OF THE INVENTION]

[OBJECT OF THE INVENTION]

[FIELD OF THE INVENTION AND DISCUSSION OF THE RELATED ART]

The present invention relates to an organic EL device using an anode supplementary electrode as well as a cathode supplementary electrode of an organic EL device flat display panel.

Generally, in fabrication of the organic EL display device of a passive matrix method, resistance of a cathode line greatly influences on power consumption of the device since the electric current of all data (anode) is on in one cathode line and the current is flowing.

The cathode uses Al generally, and it's difficult to form the cathode supplementary electrode by a general semiconductor process since an organic object is formed and then the cathode is formed thereon.

FIG.1 illustrates a plan view of a related art full

color organic EL display device and FIG. 2 illustrates a plan view of a related art shadow mask.

Referring to FIGS. 1 and 2, a transparent electrode, ITO strip (2), is formed on a glass substrate (1) for permitting both ends, and R, G, B pixel (3-1, 3-2, 3-3) are formed thereon with a shadow mask (4).

The organic EL device has no cathode supplementary electrode. It has defects that electricity consumption of the device is increased as resistance of the cathode high.

Also, the cathode uses A1 generally, and it's difficult to form the cathode supplementary electrode by a general semiconductor process since an organic object is formed and then the cathode is formed thereon.

[TECHNICAL TASKS TO BE ACHIEVED BY THE INVENTION]

Accordingly, the present invention is directed to an organic EL device that substantially obviates one or more problems due to limitations and disadvantages of the related art.

An object of the present invention is to provide an organic EL device for reducing the resistance of a cathode by forming a cathode supplementary electrode on an electricity insulating film, covering with a shadow mask for not being deposited to a part of the supplementary electrode when forming organic film and depositing, and

forming a cathode so as to contact with the supplementary electrode at a portion that the organic matter is not deposited.

[SYSTEM AND OPERATION OF THE INVENTION]

To achieve these objects and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein, the organic EL forming an organic EL layer includes a cathode supplementary electrode formed on an electric insulating film.

Preferably, the cathode supplementary electrode is formed of a material selected from Cr, Al, Au, W, Cu, Ni, and Ag.

In another aspect of the present invention, the manufacturing process of the organic EL device having an organic EL layer includes a step of forming a cathode supplementary electrode on an electric insulating film, a step of forming an organic film by covering the supplementary electrode with a shadow mask, and a step of contacting the supplementary electrode at a portion that the organic film is not formed.

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

FIGS. 3aa to 3ga illustrate perspective views each showing an organic EL device according to the present invention and FIGS. 3ab to 3gb illustrate plan views each showing an organic EL device according to the present invention.

First of all, referring to FIGS. 3aa and 3ab, ITO or anode (11), a transparent electrode, is formed on a glass substrate (10).

At this time, an ITO strip wiring (11-2) for extracting a cathode (13) is simultaneously formed.

Referring to FIGS. 3ba and 3bb, a supplementary electrode (11-1) can be used for reducing resistance of anode (11).

The supplementary electrode (11-1) is formed of a metal that has a resistance, such as Cr, Al, Cu, W, Au, Ni, and Ag.

Referring to FIGS. 3ca and 3cb, an insulating film (12) is formed on the anode (11).

The insulating film (12) may be formed of any organic or inorganic material, as far as the material is insulator.

Referring to FIGS. 3da and 3db, a cathode supplementary electrode (13-1) is formed on the insulating film.

The supplementary electrode (13-1) may be formed

anywhere as far as it is on the insulating film (12), and every portion which will be a cathode line should be divided as indicated 'b'.

Moreover, a cathode (13) and a portion for contacting (13-2) are formed afterwards.

In the same way as the anode supplementary electrode (11-1), the cathode supplementary electrode (13-1) is formed of a metal that has a resistance.

Referring to FIGS. 3ea and 3eb, an electric insulating strip (14) is formed.

Meanwhile, referring to FIG.6, a shadow mask is formed.

At this time, a shadow mask projected part (15-1) is formed for contacting with the cathode supplementary electrode (13-1) so as to deposit organic matters R, G, and B as shown in FIGS. 3fa and 3fb while the organic matters are not deposited on a part that the cathode (13) contacts with the cathode supplementary electrode (13-1).

In case of a mono, a shadow mask forming a hole at once can be used.

And then, referring to FIGS. 3ga and 3gb, the cathode (13) is formed by using a blank shadow mask.

The cathode (13) is formed of Mg-Ag alloy, Al, or other conductive material.

At this time, as shown in a and b, section views of

3gb, the cathode (13) contacts with the cathode supplementary electrode (13-1). It is illustrated in FIGS. 4 and 5.

After forming the cathode (13), though not illustrated, an oxygen adsorption layer, a moisture adsorption layer and a moisture-proof layer which are protective film layers are formed, and encapsulated.

[EFFECT OF THE INVENTION]

As aforementioned, an efficiency of the organic EL device can be improved since a resistance of the cathode is reduced by forming a cathode supplementary electrode on an electricity insulating film for reducing a resistance of the cathode, covering with a shadow mask for not being deposited to a part of the supplementary electrode when forming organic film and depositing, and forming a cathode so as to contact with the supplementary electrode at a portion that the organic matter is not deposited.

It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention.

Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the appended claims

and their equivalents.

What is claimed is :

1. In an organic EL forming an organic EL layer, an organic device includes a cathode supplementary electrode formed on an electric insulating film.

2. An organic device as claimed in claim 1, wherein the cathode supplementary electrode is formed of a material selected from Cr, Al, Au, W, Cu, Ni, and Ag.

3. In a manufacturing process of the organic EL device forming an organic EL layer, a manufacturing method of an organic EL device includes:

a step of forming a cathode supplementary electrode on an electric insulating film;

a step of forming an organic film by covering the supplementary electrode with a shadow mask; and

a step of contacting the supplementary electrode at a portion that the organic film is not formed.

[DRAWINGS]

FIG. 1

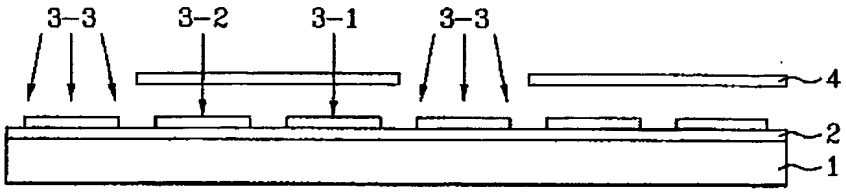


FIG. 2

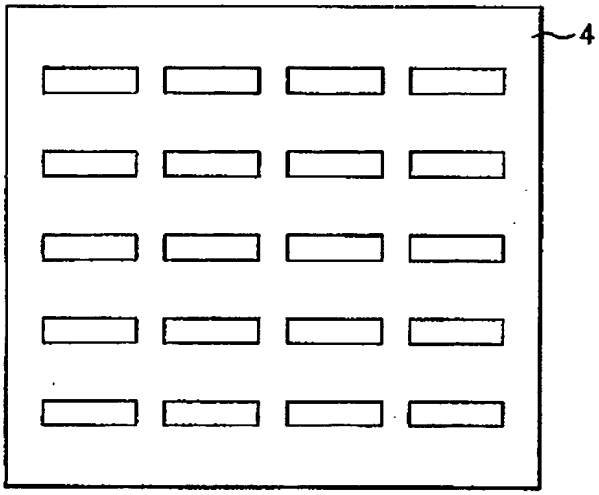


FIG. 3aa

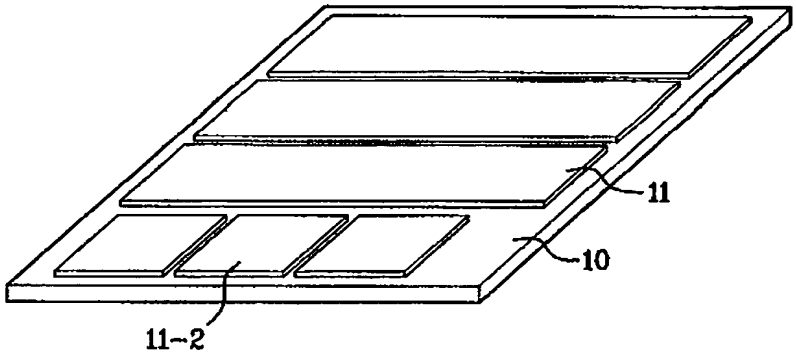


FIG. 3ab

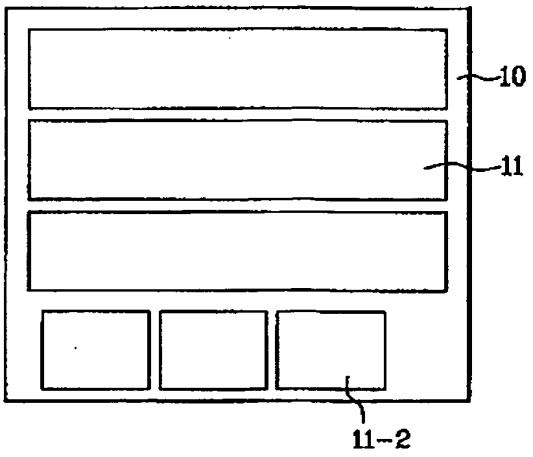


FIG. 3ba

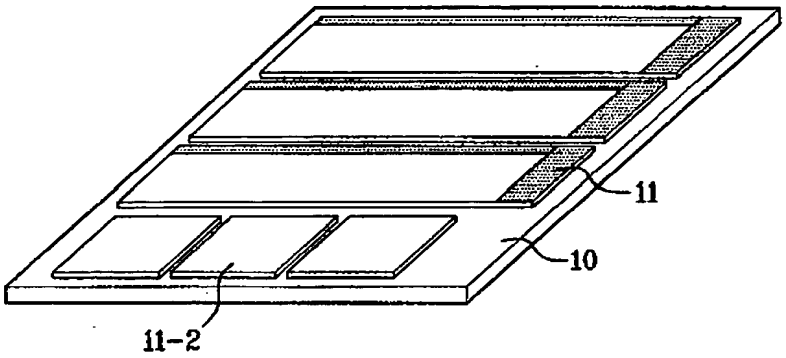


FIG. 3bb

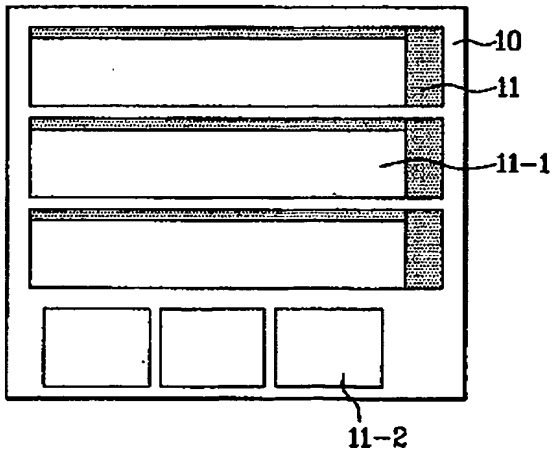


FIG. 3ca

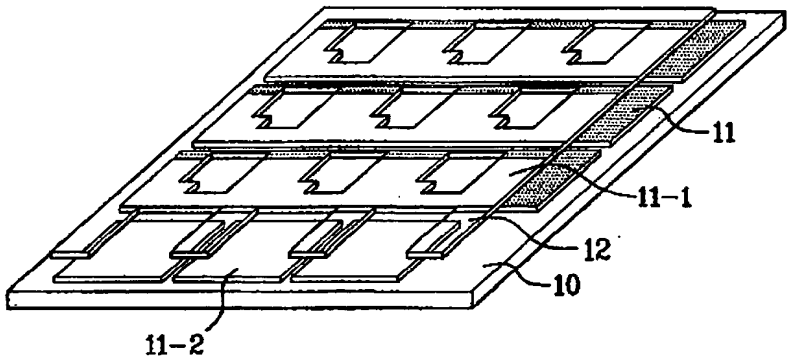


FIG. 3cb

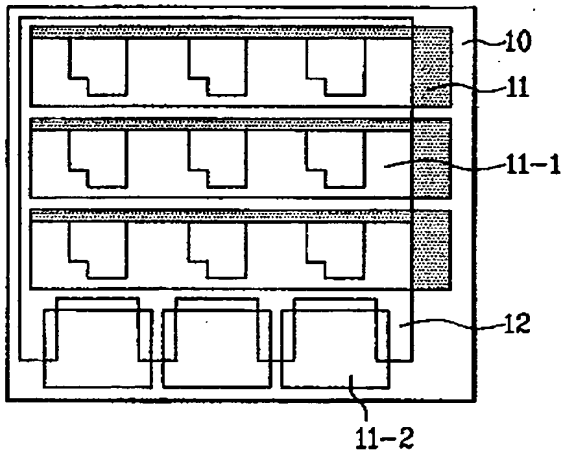


FIG. 3da

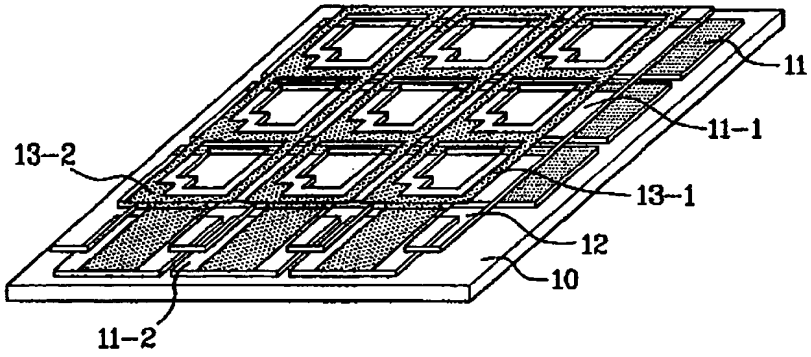


FIG. 3db

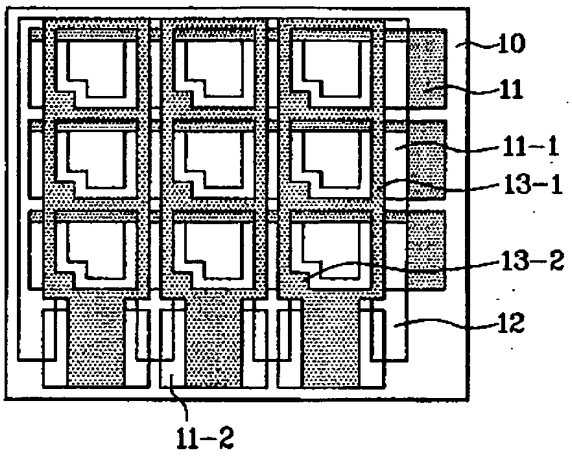


FIG. 3ea

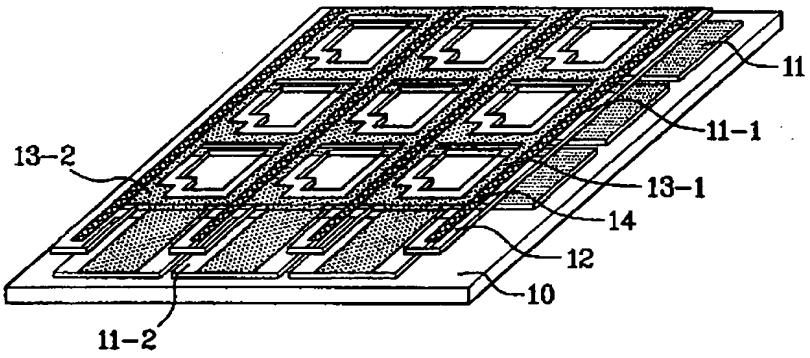


FIG. 3eb

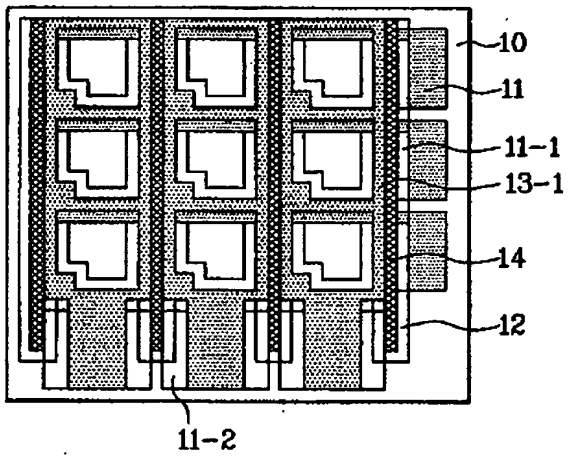


FIG. 3fa

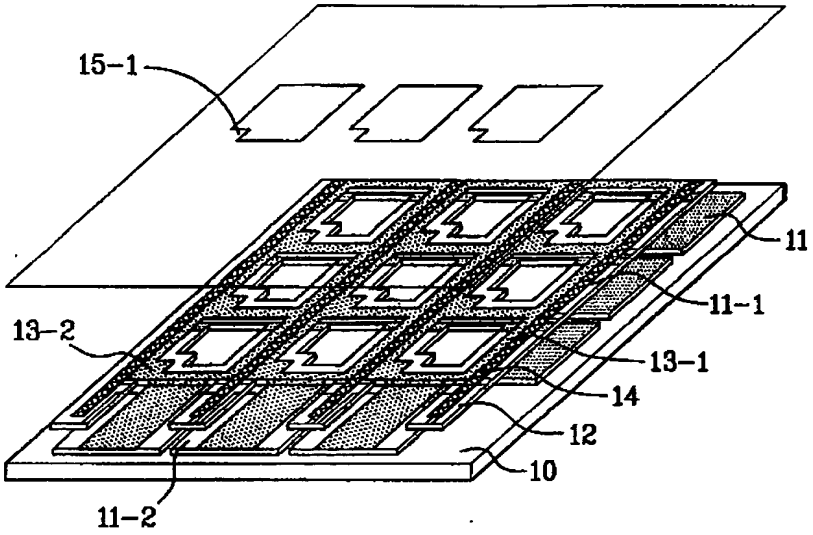
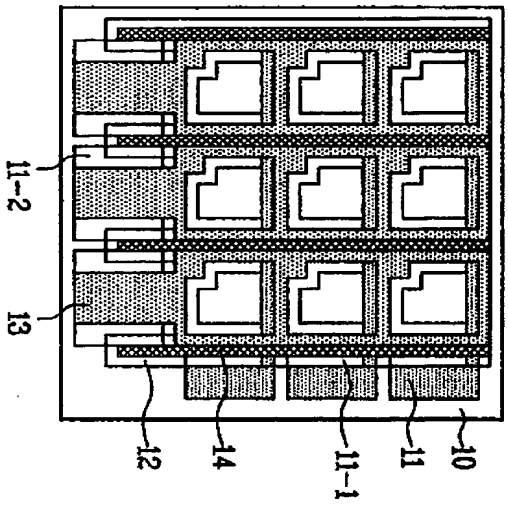


FIG. 3fb



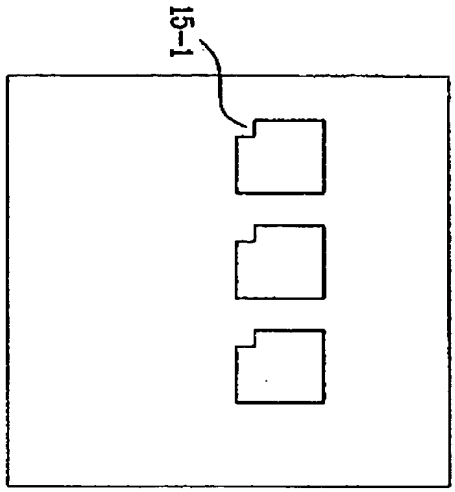


FIG. 3ga

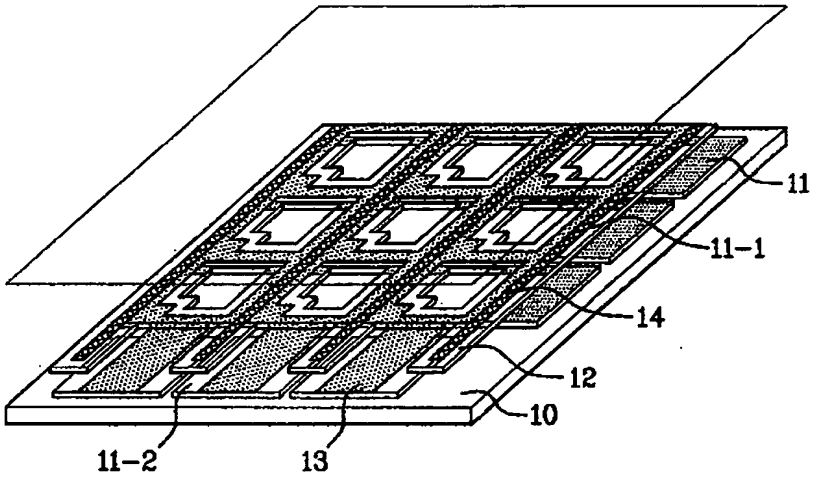


FIG. 3gb

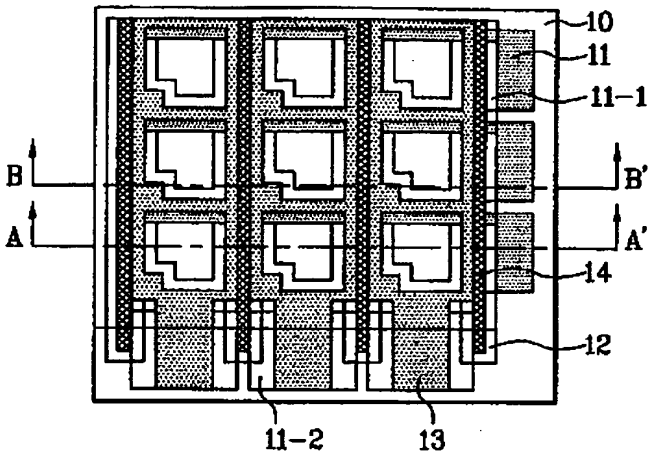


FIG. 4

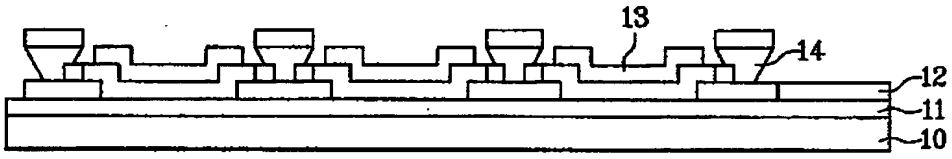


FIG. 5

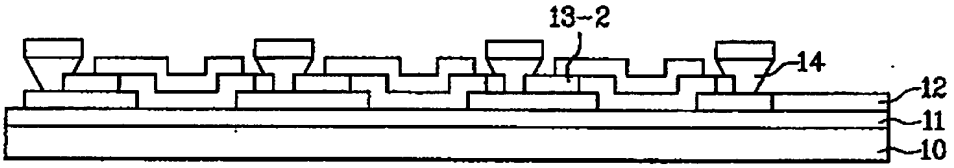


FIG. 6